Amendments to the Specification:

Please replace the paragraph beginning at page 22, line 5, with the following amended paragraph:

Fig. 10 is a diagram of an amplification module utilizing EDFA (Erbium Doped Fiber Amplifier) with AOGC (All Optical Gain Control), in accordance with an embodiment of the present invention. The EDFA 1000 ensures that the required gain control and flatness for a total input power is within a suitable range, which depends on the maximum number of channels and input power per channel. An amplification section based on EDFA 1000 can be implemented in the transmitting terminals 701 and 751, line sites 707 and 755, and receiving terminals 703 and 761 of the systems of Figs. 7a and 7b. Amplification section 1000 includes an optical isolator 1001 that is connected to a fiber Bragg grating (FBG) 1003; in an exemplary embodiment, the wavelength length of FBG 1003 is 1565nm. A three-port optical circulator 1005 receives the output of the ~~optical circulator 1005~~ FBG 1003 at one port; a second port of the ~~FBG 1003~~ circulator 1005 is connected to a variable attenuator (VA) 1007.

Please replace the paragraph beginning at page 22, line 16, with the following amended paragraph:

The third port of the optical circulator 1005 is input to a WDM module 1009. WDM 1009 also receives an input from a pump laser 1013, and outputs to an Erbium (Er) doped fiber ~~(Er)~~ 1015. Another WDM module 1017 couples to an end of the ~~ER~~ fiber 1015; the WDM 1017 is connected to a three-port optical circulator 1019 and a pump laser 1021. The optical circulator 1019 is coupled to ~~a~~ an FBG 1023 and a variable attenuator 1025. An optical circulator 1027 receives input from FBG 1023, and outputs to an optional OADM/GEF unit 1029, which is connected to a DCF 1031.

Please replace the paragraph beginning at page 27, line 10, with the following amended paragraph:

Fig. 15 shows the structure of a line site in which extraction and regeneration is performed at an optical service channel (OSC) unit, according to an embodiment of the present

invention. The two reference channels, which can be used as redundant optical service channels, are extracted and inserted at each line site.[[.]] In other words, the reference signals can also be used as safety channels for the RPU 501, and eventually as OSCs. OSCs are more fully described in U.S. Patent No. 5,113,459 to Grasso et al., which is incorporated herein in its entirety. Because the reference signals RC1 and RC2 degrade as they propagate along the fiber link, they are periodically regenerated. For example, the reference signals RC1 and RC2 can be regenerated where the gain equalizing filters are introduced or, in general, every N span (with $N \geq 1$) depending on the requirements of the optical communication system.

Please replace the paragraph beginning at page 28, line 12, with the following amended paragraph:

The optical line amplifier (OLA) 1505[[,]] has a similar configuration as the OLA 1203 of Fig. 13, in that both OLAs 1203 and 1505 include a pre-amplifier 1505a that is coupled to an MAL 1505b. The MAL ~~1506~~ 1505b outputs to a booster amplifier ~~1506~~ 1505c. Thereafter, the output of the BOOSTER ~~1506c~~ 1505c is fed back to the input of PRE 1505a via a variable attenuator 1505d. The reference channels RC1 and RC2 are inserted at the amplifier input to control gain non-uniformity that is introduced by the EDFA.

Please replace the paragraph beginning at page 30, line 5, with the following amended paragraph:

Fig. 19 is a diagram of a co-propagant Raman pump unit, in accordance with an embodiment of the present invention. Co-propagant RPU 1900 has an optical circuit 1901, which includes an electronic controller 1903 for controlling the pump modules 1401. As shown, the co-propagant RPU 1900 contains many common components with that of a counter-propagant RPU 1400 (Fig. 14). Unlike the counter-propagant RPU unit 1400 of Fig. 14, the electronic controller 1903 connects to a photodiode 1905, which is coupled to a filter 1907. The filter is coupled to a splitter 1909 and filters out the residual pump power that is back-scattered by the transmission fiber (not shown). The RPU ~~1501~~ 1901 is controlled to perform the safety

measure of shutting off when no power is received from the preceding EDFA or when no fiber is connected to the unit ~~1501~~ 1901.